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(56) Documents cited
GB 2181222 A GB 2167172 A GB 2015138 A
GB 1276175 A

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(54) Conduit in washer-dryer

(57) Conduit for circulating air for drying laundry in a combined machine for washing and drying laundry, formed by various component parts (7, 8, 10, 12) which are connected to each other and which are fitted directly to the various internal surfaces of the casing (3) of the machine and the external surface of the tub (4) of the machine. The ends of the conduit (6) are respectively introduced into the flexible bellows (13) for making a connection between the corresponding circular front openings (13, 15) in the casing and in the tub, and connected to the tub (4) by way of a flexible sleeve (16). In that way, by being freed from the tub, the conduit is not subjected to the oscillations of the tub-drum unit and can be produced with a simple structure that is easy to assemble.

Fig.2.

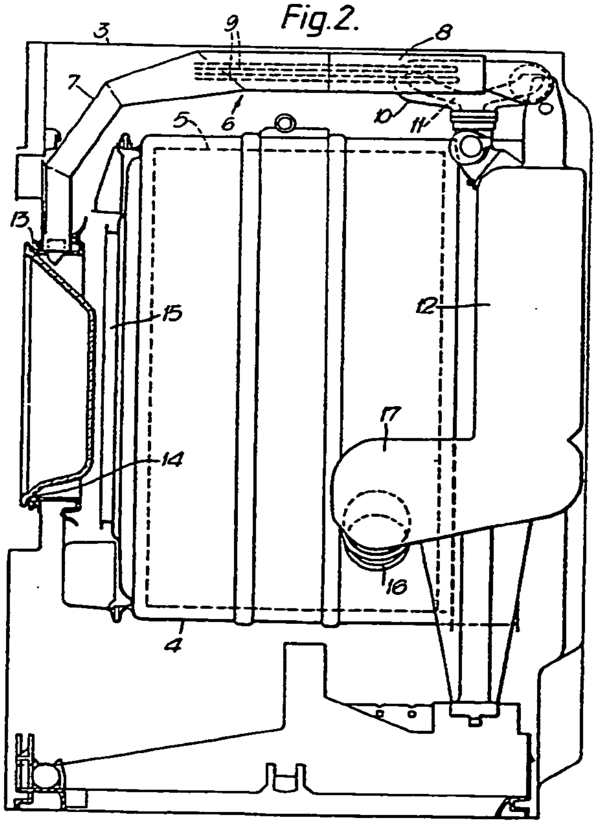

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Fig.1.

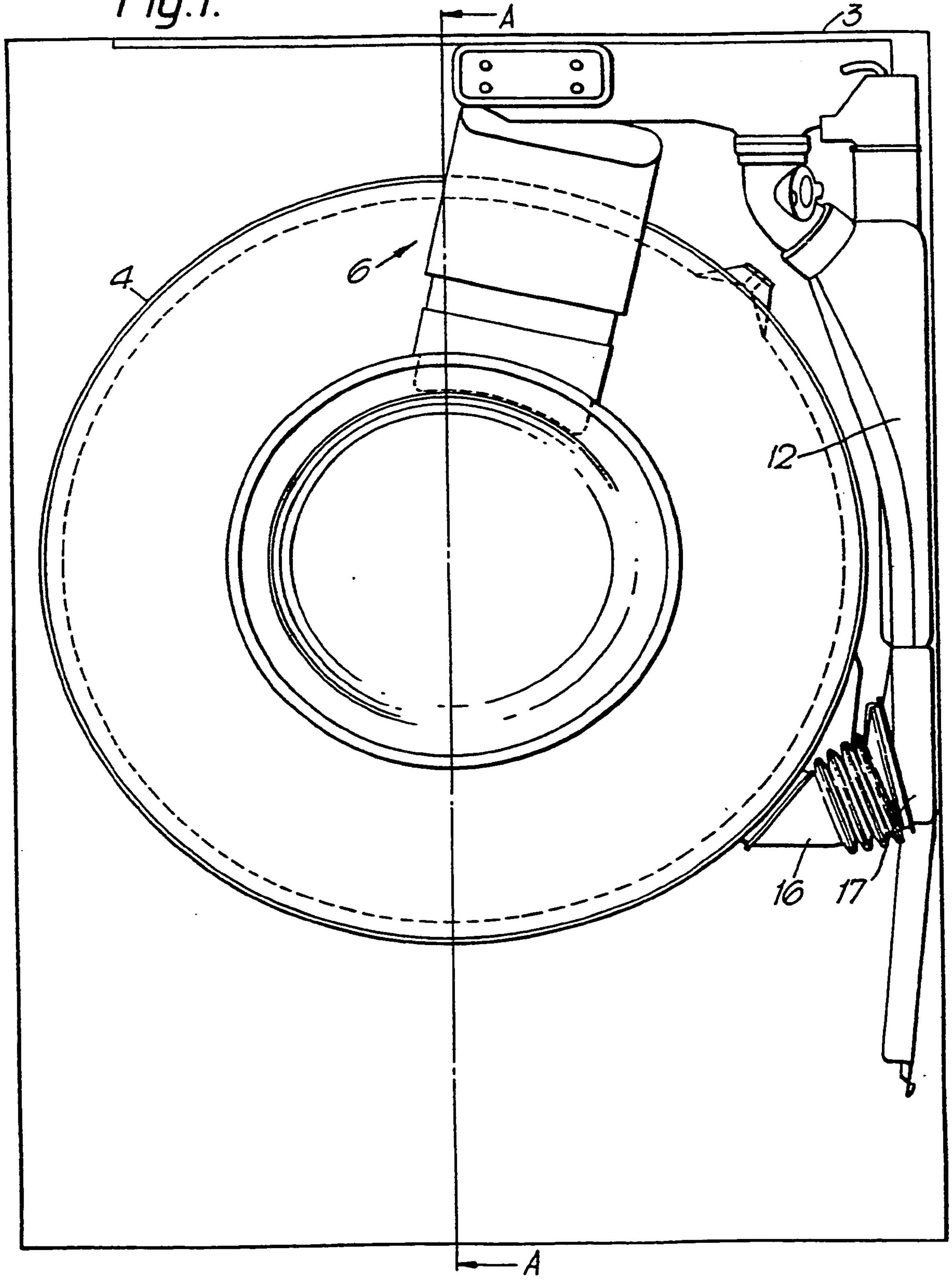
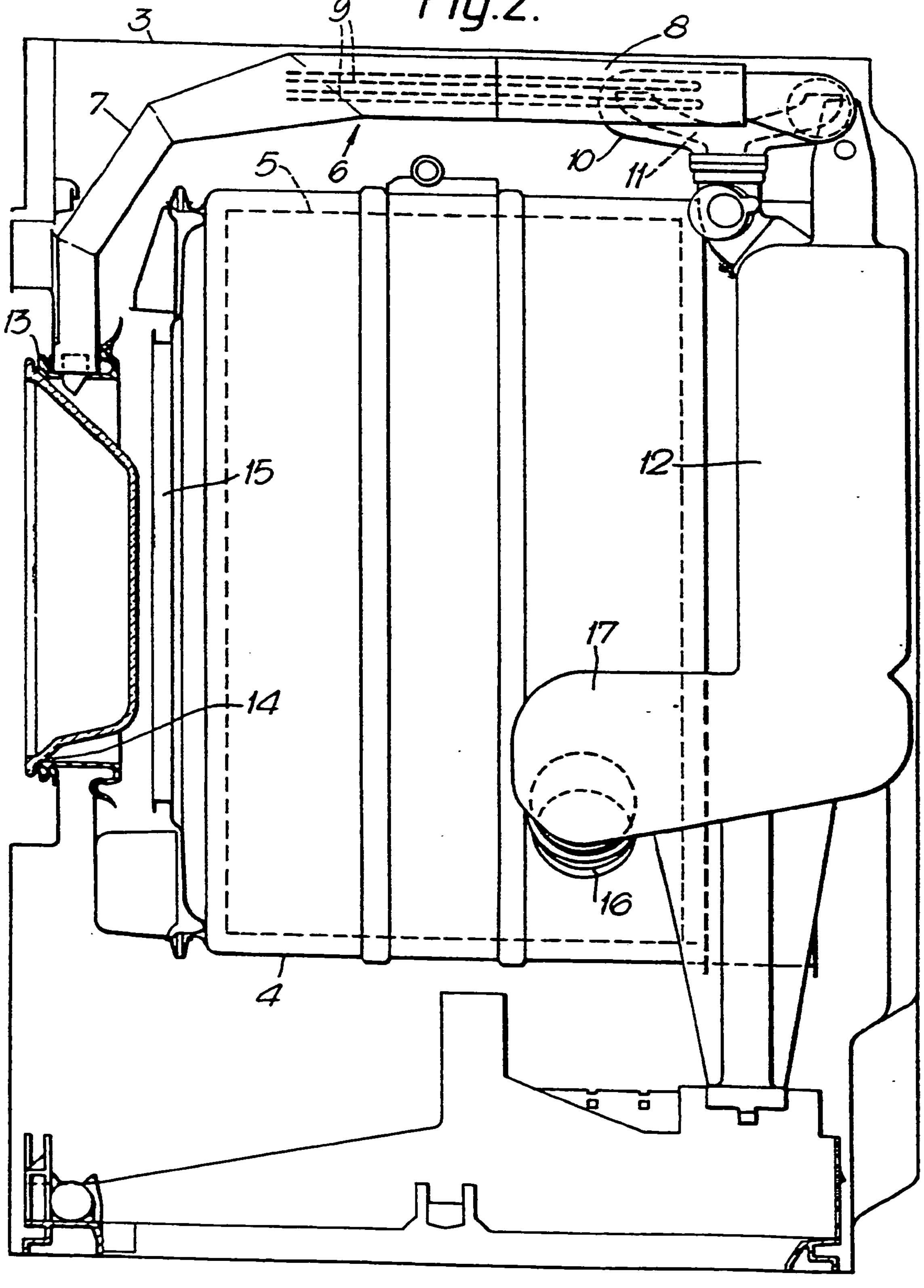


Fig.2.



AIR CIRCULATION CONDUIT FOR A LAUNDRY DRYING MACHINE

The invention concerns a conduit for circulating air for drying laundry for a laundry drying machine, in particular for a combined machine for washing and drying laundry, the conduit being of a simple structure which can be easily fitted to that type of machine.

Laundry drying machines, in particular combined machines for washing and drying laundry, are known, which substantially comprise an external metal casing, a tub accommodating a rotating drum for containing the laundry to be washed and dried and a conduit for circulation of the air for drying the laundry, connected to the tub and to at least one fan and an electrical heating element which is provided for heating the air.

In that way such machines are capable of successively effecting washing of the laundry by means of the introduction of washing liquid into the tub and execution of conventional laundry washing and rinsing cycles, with final discharge of the washing liquid from the tub at the end of the washing cycles, and drying of the laundry by means of a circulation in a closed circuit through said conduit of a flow of air which is produced by the fan and heated by the heating element.

In particular, in the present combined machines for washing and drying laundry, the conduit for circulating the hot air is generally formed by a plurality of prefabricated component parts which are connected together and to said fan and heating element and fitted to the external surface of the tub in such a way that one end thereof is disposed at the location of the flexible bellows for making the connection between the corresponding front openings in the casing and the tub and the other end thereof is directly connected to the tub. However while the conduit when fitted in that way to the tub of the machine ensures effective circulation of the hot air for drying the laundry, such as to permit satisfactory drying thereof, it is continuously subjected to the oscillations of the tub-drum unit during operation of the machines, those oscillations being particularly accentuated when the machine is executing laundry spin phases in which the drum is caused to rotate at very high speeds, with consequential progressive deformation of the materials forming the conduit, more especially in the region of the connection between the various component parts of the conduit; in the course of time, that fact can give rise to a deterioration in the circulation of the flow of hot air through the conduit and occasionally may simply even result in the conduit breaking.

It would therefore be desirable, and this is the aim of the present invention, to provide a conduit for the circulation of drying air for machines of that kind, such as to reduce or eliminate the above-indicated disadvantages and to ensure satisfactory and reliable operation for all the functional conditions of the machines.

According to the present invention there is provided a laundry drying machine, comprising an external casing, a tub with a rotary laundry drum disposed therein, a conduit for circulating air for drying laundry in the drum, at least one electrical heating element and a fan which are disposed in associated containing portions of the conduit and which are provided respectively for heating and producing a flow of drying air which circulates through said conduit, and also comprising an optional condenser, said conduit being formed by a plurality of component parts which can be mutually assembled and disassembled and which incorporate said heating element, and said fan and which communicate with said tub at the locations of the associated ends of the conduit, the conduit parts being fixed against the internal surfaces of said casing and the associated ends of said conduit being in communication with said tub by way of flexible junction means.

The invention will be better appreciated from the following description given solely by way of non-limiting example and with reference to Figures 1 and 2 which respectively diagrammatically show a front view and a side view in section taken along line A-A in Figure 1 of a combined machine for washing and drying laundry embodying the present invention.

With reference to the drawings, diagrammatically shown therein is a laundry drying machine, in particular a combined machine for washing and drying laundry, substantially comprising a metal casing 3, a metal tub 4 supported within the casing in conventional manner, a rotary drum 5 disposed within the tub 4 and drivable in rotation by an electric motor (not shown) at different speeds of rotation during execution of the laundry washing and drying cycles, and further comprising a conduit 6 for the circulation of hot air for drying the laundry, formed by a plurality of prefabricated component parts connected together and to said tub to provide for progressive drying of the laundry contained in the drum by means of a circulation in a closed circuit of the hot air through the conduit 6 and the interior of the drum.

In the embodiment shown in figures 1 and 2, the conduit 6 is substantially formed by the interconnection of a first suitably shaped portion 7, a second portion 8 of almost box-like shape capable of containing at least one conventional electrical heating element 9 of armoured or sheathed type which is provided for heating the drying air which circulates through the conduit, a third portion 10 in the form of a circular housing capable of containing at least one fan 11 of conventional type which is provided to produce the flow of drying air through the conduit, and a fourth portion 12 constituting the condenser for condensation of the water vapour which is produced during the drying phase, by means of the spraying of water in counter-flow relationship with respect to the direction of circulation of the water vapour. In accordance with the innovative characteristic of the invention, all those component portions are no longer fitted to the external surface of the tub, as in the present constructions provided for this type of machine, but they are fixed directly against the various internal surfaces of the casing with per se known fixing devices.

Advantageously, in order to achieve effective drying of the laundry and condensation of the moisture produced therefrom, those portions are disposed in such a way that the first portion of the conduit 7 which is suitably curved is introduced with an end thereof into the flexible bellows 13 which makes the connection between the corresponding circular front openings 14 and 15 in the casing and in the tub, and connected by its other end to the second box-like portion 8 while in turn the latter is fitted in the upper part of the machine above the tub 4, together with the third housing portion 10 which is connected to the second box-like portion 8, and the fourth condenser portion 12 is fitted in the machine at the side and is connected at its upper part to the third housing portion 10.

With that arrangement of the component parts as described above therefore the drying air circulation conduit is communicated with the interior of the tub 4 by way of its ends, one of which is formed by the conduit portion 7 which is introduced into the above-described flexible bellows 13 and the other of which is connected by means of a flexible sleeve or coupling 16 to the corresponding, suitably shaped, lower end 17 of the condenser portion 12.

By virtue of that arrangement of the conduit for circulating drying air within the casing of the machine, in a separate position with respect to the tub, to which it is therefore connected only at its ends, the conduit is not subjected to the oscillations of the tub-drum unit during washing and drying of the laundry and is therefore always rigidly fitted to the corresponding internal surfaces of the casing without the possibility of suffering deformation during execution of the operating cycles. Under those circumstances therefore the oscillations act only on the component parts of the conduit which directly communicate with the tub, that is to say the flexible bellows 13 and the flexible sleeve 16, which parts however are so designed as to withstand that kind of continuous stressing without suffering deformation or rupture. Consequently the conduit when fitted in the machine in that way is made of a simple structure and makes it possible to ensure satisfactory and reliable functioning for all the operation conditions of the machines. In addition, by virtue of the modular composition and the extremely simple and fast assembly of such a conduit in the machines, it is also possible rapidly to convert any combined machine into a laundry washing machine of conventional type, still using the same tub-drum unit, by dismantling and removing from the conduit the heating elements, the fan, the condenser and the flexible sleeve 16, and closing off the corresponding hole in the tub to which the flexible sleeve was connected.

CLAIMS

1. A laundry drying machine, comprising an external casing, a tub with a rotary laundry drum disposed therein, a conduit for circulating air for drying laundry in the drum, at least one electrical heating element and a fan which are disposed in associated containing portions of the conduit and which are provided respectively for heating and producing a flow of drying air which circulates through said conduit, and also comprising an optional condenser, said conduit being formed by a plurality of component parts which can be mutually assembled and disassembled and which incorporate said heating element, and said fan and which communicate with said tub at the locations of the associated ends of the conduit, the conduit parts being fixed against the internal surfaces of said casing and the associated ends of said conduit being in communication with said tub by way of flexible junction means.

2. A machine according to claim 1 in which the conduit incorporates a condenser for condensing in per se known manner the water vapour produced during drying of the laundry.

3. A laundry drying machine constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

4. A combined laundry washing and drying machine according to any one of the preceding claims.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

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Relevant Technical fields

(i) UK Cl (Edition K) F4G (. GCRA,GCRB,GCRC)

(ii) Int Cl (Edition 5) D06F 58/00, 58/02, 58/04

Search Examiner
A G SMITH

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES WPI:

Date of Search
20 DECEMBER 1991

Documents considered relevant following a search in respect of claims 1-4

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2181222 A (Philips Electronic and Associated Industries Ltd) See lines 30-40 on page 2	1,2
Y	GB 2167172 A (Sangiorgio) See lines 25-29 on page 2	1,2
Y	GB 2015138 A (August Lepper) See flexible connection 20, as discussed in lines 127-129 on page 1	1,2
Y	GB 1276175 (Schaumann) See lines 73-80 on page 2	1,2

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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